

IN THE CLAIMS

1. (Previously Presented) A flow control hub, comprising:
a scoreboard memory device to maintain flow control status for a plurality of flows,
wherein each of the flows is identified by an associated index in the scoreboard memory;
an address decoder to receive a flow control message from a destination desiring to
modify flow of data thereto, and to determine an associated flow and scoreboard memory index
for the flow control message; and
an updater to update the flow control status for the associated flow in said scoreboard
memory device based on the received flow control message.
2. (Original) The apparatus of claim 1, wherein the plurality of flows may be based
on at least some subset of source, destination, protocol, priority, class of service and quality of
service.
3. (Original) The apparatus of claim 1, wherein the flow control message is received
in response to capacity of a queue.
4. (Original) The apparatus of claim 1, wherein the flow control message is received
in response to changing priorities.
5. (Original) The apparatus of claim 1, wherein said updater includes a comparator
to compare the received flow control message with the flow control status maintained in said
scoreboard memory device and said updater updates the flow control status maintained in said
scoreboard memory device based on the comparison.
6. (Original) The apparatus of claim 5, wherein said updater updates the flow
control status maintained in said scoreboard memory device to reflect status identified in the
received flow control message if the comparator determines the associated index has either no
status, no valid status or a different status than the received flow control message.

7. (Original) The apparatus of claim 5, wherein said updater makes no changes to the flow control status maintained in said memory device if the comparator determines the associated index has the same flow control status as the received flow control message.

8. (Original) The apparatus of claim 1, wherein said updater discards the received flow control message.

9. (Original) The apparatus of claim 1, further comprising a message generator to generate a flow control message for a particular flow based on the flow control status maintained in said scoreboard memory device for the particular flow.

10. (Original) The apparatus of claim 9, further comprising a selector to select the particular flow.

11. (Original) The apparatus of claim 1, wherein the flow control message is a broadcast message.

12. (Original) The apparatus of claim 11, wherein said updater updates the flow control status for all flows associated with the broadcast message.

13. (Original) The apparatus of claim 1, wherein said address decoder utilizes a mapping table to determine the associated index.

14. (Previously Presented) A flow control hub, comprising:
a scoreboard memory device to maintain flow control status for a plurality of flows, wherein each of the flows is identified by an associated index in the scoreboard memory;
a selector to select a next flow having a flow control status to process; and
a message generator to generate a flow control message for the selected flow based on the flow control status maintained in said scoreboard memory device for the selected flow.

15. (Previously Presented) The apparatus of claim 14, wherein said message generator transmits the generated flow control message to a queue associated with the selected flow.

16. (Previously Presented) The apparatus of claim 15, wherein said message generator invalidates the flow control status maintained in said scoreboard memory device subsequent to transmitting the generated flow control message.

17. (Previously Presented) The apparatus of claim 15, wherein said message generator erases the flow control status maintained in said scoreboard memory device subsequent to transmitting the generated flow control message.

18. (Previously Presented) The apparatus of claim 14, further comprising an address decoder to receive a flow control message from a destination desiring to modify flow of data thereto, and to determine an associated flow and scoreboard memory index for the flow control message; and

an updater to update the flow control status for the associated flow in said scoreboard memory device based on the received flow control message.

19. (Previously Presented) A method, comprising:
maintaining a flow control status for a plurality of flows in a memory device, wherein each of the flows is identified by an associated index in the memory device;
selecting a next flow having a flow control status to process; and
generating a flow control message for the selected flow based on the flow control status maintained in the memory device for the selected flow.

20. (Previously Presented) The method of claim 19, further comprising transmitting the generated flow control message to a queue associated with the selected flow.

21. (Previously Presented) The method of claim 20, further comprising invalidating the flow control status maintained in the memory device for the selected flow.

22. (Previously Presented) The method of claim 19, further comprising receiving a flow control message from a destination desiring to modify flow of data thereto;
determining an associated flow and memory device index for the flow control message;
and
updating the flow control status for the associated flow maintained in said memory device based on the received flow control message.

23. (Previously Presented) A method comprising maintaining a flow control status for a plurality of flows in a memory device, wherein each of the flows is identified by an associated index in the memory device;
receiving a flow control message from a destination desiring to modify flow of data thereto;
determining an associated flow and memory device index for the received flow control message;
updating the flow control status for the associated flow maintained in said memory device based on the received flow control message.

24. (Original) The method of claim 23, wherein said updating includes comparing the received flow control message with the flow control status maintained in the memory device and updating the flow control status maintained in the memory device based on results of the comparing.

25. (Original) The method of claim 24, wherein said updating includes updating the flow control status maintained in the memory device to reflect status identified in the received flow control message if the comparing determines the associated index has either no status, no valid status or a different status than the received flow control message.

26. (Original) The method of claim 24, wherein said updating includes making no changes to the flow control status maintained in the memory device if the comparing determines the associated index has the same flow control status as the received flow control message.

27. (Original) The method of claim 23, further comprising discarding the received flow control message.

28. (Original) The method of claim 23, further comprising
generating a flow control message for a particular flow based on the flow control status maintained in the memory device for the particular flow; and
selecting the particular flow.

29. (Original) The method of claim 23, wherein said receiving includes receiving a broadcast flow control message.

30. (Original) The method of claim 29, wherein said updating includes updating the flow control status for all flows associated with the broadcast message.

31. (Original) The method of claim 23, wherein said determining includes utilizing a mapping table to determine the associated index.

32. (Previously Presented) A store and forward device comprising:
a plurality of Ethernet cards including
a plurality ingress ports to receive data from external sources and transmit the data based on flow of the data, wherein each ingress port has a plurality of ingress queues associated with a plurality of flows, and wherein transmission of data from a particular queue is controlled at least in part by a flow control status associated with the queue; and
a plurality of egress ports to receive data from at least a subset of the plurality of flows, wherein each egress port has an egress queue for holding the data prior to transmission, and

wherein each egress queue issues flow control messages based at least in part on capacity of the egress queue;

a backplane to connect the plurality of Ethernet cards together; and

a flow control hub to receive flow control messages from the egress ports, maintain a flow control status for each flow based on the received flow control messages, select a next flow having a flow control status to process, and generate and forward flow control message to queue associated with the selected flow.

33. (Previously Presented) The device of claim 32, wherein said flow control hub includes a memory device to maintain the flow control status for the plurality of flows, wherein each of the flows is identified by an associated index in the memory device.

34. (Previously Presented) The device of claim 33, wherein said flow control hub further includes

an address decoder to receive the flow control messages from the egress queues and to determine an associated flow and memory device index;

an updater to update the flow control status for the associated flow in the memory device based on the received flow control message;

a selector to select a next flow having a flow control status to process; and

a message generator to generate a flow control message for the selected flow based on the flow control status maintained in the memory device for the selected flow and to transmit the generated flow control message to an ingress port associated with the selected flow.

35. (Previously Presented) A device comprising:

a plurality of ingress ports to receive data from external sources and to store the data in a plurality of ingress queues, wherein the ingress queues are associated with flows, wherein the flows are associated with at least some subset of source, destination, and priority;

a plurality of egress ports to receive data from at least a subset of the plurality of ingress queues and to store the data in a plurality of egress queues prior to transmission, wherein the

egress ports issue flow control messages to control flow of data to the egress ports based at least in part on capacity of the egress queues; and

a flow control hub to receive the flow control messages from the egress ports, to record a flow control status for an associated flow in a scoreboard memory based on the received flow control message, to discard the received flow control message subsequent to recording the flow control status, to select next flow having a valid flow control status to process, to generate a flow control message for the next flow, and to forward the generated flow control message to ingress ports associated with the next flow.

36. (Previously Presented) The device of claim 35, wherein said flow control hub includes a comparator to compare the received flow control message with the flow control status maintained in said scoreboard memory device and update the flow control status maintained in the scoreboard memory device based at least in part on the comparison.

37. (Previously Presented) A flow control hub comprising:

a memory device to maintain a flow control status for a plurality of flows, wherein a flow defines at least a path from a particular ingress port to a particular egress port and wherein a flow control status for a particular flow defines whether data is eligible for transmission for the particular flow; and

a queuing device to receive flow control messages from at least one egress port, to update the flow control status in the memory device for associated flows, and to discard the flow control messages, wherein the flow control message may modify the transmission eligibility of data to the egress port for one or more flows.

38. (Previously Presented) The flow control hub of claim 37, further comprising a dequeuing device to select a next flow having a flow control status to be processed, to generate a flow control message based on the next flow control status, and to forward the generated flow control message to associated ingress ports.

39. (Previously Presented) The flow control hub of claim 37, wherein the memory device further maintains whether the flow control status is valid for the plurality of flows.

40. (Previously Presented) The flow control hub of claim 37, wherein the flow control message is a broadcast message and the flow control status for appropriate flows is updated in the memory device.

41. (Previously Presented) A method comprising
maintaining a flow control status for a plurality of flows in a memory device, wherein a flow defines at least a path from a particular ingress port to a particular egress port and wherein a flow control status for a particular flow defines whether data is eligible for transmission for the particular flow;

receiving flow control messages from at least one egress port, wherein the flow control message may modify the transmission eligibility of data to the egress port for one or more flows;

updating the flow control status in the memory device for associated flows based on the received flow control messages; and

discarding the flow control messages after the memory device is updated.

42. (Previously Presented) The method of claim 41, further comprising validating a particular flow subsequent to the particular flow being updated.

43. (Previously Presented) The method of claim 41, further comprising
selecting a next flow having a flow control status to be processed;
generating a flow control message based on the next flow control status; and
forwarding the generated flow control message to associated ingress ports.

44. (Previously Presented) The method of claim 43, further comprising invalidating a particular flow subsequent to the particular flow having a flow control message generated and forwarded.